

## 1 Multiple Choice Questions, Part I

Circle one answer. You do not need to show your work. There will be no partial credit.

~~C~~ 1. If  $Z \sim \mathcal{N}(0, 1)$ , find the constant  $c$  such that  $\mathbb{P}(|Z| > c) = 0.70$ .

A. -0.52

B. 0.21

~~C~~ 0.39

D. 0.52

~~E~~ 1.04

C

~~D~~ 2. A regular soccer match is played for two halves of 45 minutes each. Suppose the time between goals follows an Exponential distribution with mean 30 minutes. Given that no goal has been scored in the first half, what is the probability that the game will end goal-less?

A. 0.05

B. 0.11

C. 0.17

D. 0.22

E. 0.28

3. The random variable  $X$  has the following p.d.f.:

$$f(x) = \begin{cases} \frac{1}{2} & 0 < x \leq 1 \\ \frac{1}{4} & 3 < x \leq 5 \\ 0 & \text{everywhere else} \end{cases}$$

~~B~~ (a) Determine the interquartile range, that is the difference between the third and first quartile of  $X$ ,  $q_3 - q_1$ .

A. 2.0

B. 2.75

C. 3.0

D. 3.25

E. 3.5

~~B~~ (b) Compute the mean of  $X$ .

A. 2.0

B. 2.25

C. 2.5

D. 2.75

E. 3.0

~~A~~ 4. A particular radioactive isotope emits alpha particles following an approximate Poisson process. The average waiting time until a particle is emitted is 0.1 seconds. Let  $T$  denote the time in seconds until the seventh particle is emitted. Determine  $\mathbb{P}(T < 0.5)$ .

A. 0.13

B. 0.24

C. 0.37

D. 0.76

E. 0.87